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Ms. Tammy Koontz Program Manager and Mr. Shelby Pittman
Office of Publications, Pre-Grant Publication Division
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App. No.	**:**	**10/708,258**	**Confirmation No. 2257**
Publication No.		**US 2004/0202540**	
Applicant	**:**	**Toru Tamagawa, et al.**	
Filed	**:**	**February 20, 2004**	

REQUEST FOR CORRECTED PATENT APPLICATION PUBLICATION

Dear Ms. Koontz and Mr. Pittman:

This constitutes a request that the publication of the above-identified application be corrected to replace numerous instances of garbled text with the legible text as originally filed.

The application was published on October 14, 2004, and therefore the publication date is not older than two months.

Attached is a set of pages containing affected paragraphs and claims from the publication version of this application, side-by-side with the corresponding paragraphs and claims from the original application. The publication version is in the left-hand column, and the original version is in the right-hand column to allow for a ready comparison between the two versions.

To provide a listing of specific and detailed items for which correction is requested, the garbled or incorrect text is circled in the left-hand column, and the correct, original text is circled in the right-hand column.

The errors appear both in the description section and the claims. Applicant believes the errors to be material to appreciating the technical disclosure of the invention in this application, and to determining the scope of the claims as filed.

Sincerely,

James W. Judge

James W. Judge
Registration No. 42,701

Attachment

Paragraph [0038]	
[0038] One of the factors related to whether or not the maximum wind-speed point along the axis appears inside the impeller—and to where it appears along the axis inside the impeller—is the shape of the impeller component. The present invention definitively sets forth that if the relationship defined by the following expressions (2) and (3) using a parameter □ is satisfied between the area of intake airflow into the impeller component 1 (that is, the area of the cross section perpendicular to the axis at the upper-end portion of the impeller component, i.e., πr^2), and the area of ejection airflow of air blown by the impeller blade unit 3 (that is, the effective cylindrical area of the impeller blade unit 3 of the impeller component that contributes to blowing of the airflow, i.e., $2\pi rh$), the airflow speed maximum will not be on the upper surface of the lower endwall portion 2, whereby the impeller produces efficient airflow. $2\pi rh = \alpha\pi r^2$ (2) $4 \leq \alpha \leq 40$ (3)	[0038] One of the factors related to whether or not the maximum wind-speed point along the axis appears inside the impeller—and to where it appears along the axis inside the impeller—is the shape of the impeller component. The present invention definitively sets forth that if the relationship defined by the following expressions (2) and (3) using a parameter α is satisfied between the area of intake airflow into the impeller component 1 (that is, the area of the cross section perpendicular to the axis at the upper-end portion of the impeller component, i.e., πr^2), and the area of ejection airflow of air blown by the impeller blade unit 3 (that is, the effective cylindrical area of the impeller blade unit 3 of the impeller component that contributes to blowing of the airflow, i.e., $2\pi rh$), the airflow speed maximum will not be on the upper surface of the lower endwall portion 2, whereby the impeller produces efficient airflow. $2\pi rh = \alpha\pi r^2$ (2) $4 \leq \alpha \leq 40$ (3)

Paragraph [0040]	
[0040] Though the airflow speed maximum should not appear on the upper surface of the lower endwall portion 2 even if □ > 40, cantilever-type impellers prove to be over-extensive axially the as n becomes larger than that, making it is difficult to obtain stable impeller rotation, and as a result loss due to impeller vibration or other factors may increase, and the cooling efficiency of the fan may decrease.	[0040] Though the airflow speed maximum should not appear on the upper surface of the lower endwall portion 2 even if $\alpha > 40$, cantilever-type impellers prove to be over-extensive axially as α becomes larger than that, making it difficult to obtain stable impeller rotation, and as a result loss due to impeller vibration or other factors may increase, and the cooling efficiency of the fan may decrease.
Paragraph [0042]	
[0042] If 5 ≤ □, the maximum wind-speed point should appear along the axis inside the impeller and at a position relatively distant from the lower endwall portion 2, producing a correspondingly sufficient drop in the airflow speed at the upper surface of the lower endwall portion 2. Therefore, the windage loss at the upper surface of the lower endwall portion 2 can be reduced further so that a centrifugal fan having higher efficiency can be realized.	[0042] If $5 \leq \alpha$, the maximum wind-speed point should appear along the axis inside the impeller and at a position relatively distant from the lower endwall portion 2, producing a correspondingly sufficient drop in the airflow speed at the upper surface of the lower endwall portion 2. Therefore, the windage loss at the upper surface of the lower endwall portion 2 can be reduced further so that a centrifugal fan having higher efficiency can be realized.

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Paragraph [0043]	
[0043] Since □ ≤35 on the other end of the range, the impeller is not over-extensive axially, so that stable rotation of cantilever-type impellers can be realized. Thus, impeller vibration is further reduced, so that a fan motor having better cooling efficiency can be realized.	[0043] Since $\alpha \leq 35$ on the other end of the range, the impeller is not over-extensive axially, so that stable rotation of cantilever-type impellers can be realized. Thus, impeller vibration is further reduced, so that a fan motor having better cooling efficiency can be realized.
Paragraph [0044]	
[0044] The above-explained comparison between the intake airflow area of the impeller component 1 and the ejection airflow area of the air blown by the impeller blade unit 3 can be applied to the case where the circular area of the impeller 2πrh is large enough relative to the total sum dhZ (where Z is the number of blades in the impeller blade unit) of the area of the cylindrical cross sections dh (where d is the blade thickness) around the axis of the impeller blade unit 3 that the latter can be neglected. However, if the diameter 2r to the outer circumference of the impeller blade unit is reduced such that the total sum of the area of the cylindrical cross sections of the impeller blade unit 3 cannot be neglected, a gap ratio □ defined by the following equation (5) must be taken into consideration. $\varepsilon=(2\pi r-Zd)/2\pi r$ (5)	[0044] The above-explained comparison between the intake airflow area of the impeller component 1 and the ejection airflow area of the air blown by the impeller blade unit 3 can be applied to the case where the circular area of the impeller $2\pi rh$ is large enough relative to the total sum dhZ (where Z is the number of blades in the impeller blade unit) of the area of the cylindrical cross sections dh (where d is the blade thickness) around the axis of the impeller blade unit 3 that the latter can be neglected. However, if the diameter $2r$ to the outer circumference of the impeller blade unit is reduced such that the total sum of the area of the cylindrical cross sections of the impeller blade unit 3 cannot be neglected, a gap ratio ε defined by the following equation (5) must be taken into consideration. $\varepsilon=(2\pi r-Zd)/2\pi r$ (5)

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Paragraph [0045]	
[0045] In this case of the present invention, the ejection airflow effective area of the air blown by the impeller blade unit 3 becomes 2πrεh. Here it is definitively set forth that if the relationship defined by the following expressions (6) and (7) using a parameter □ is satisfied, the airflow speed will not have the maximum value on the upper surface of the lower endwall portion 2, so that higher cooling efficiency with higher static pressure can be obtained. $2\pi r\varepsilon h = \beta r^2$ (6) $3 \le \beta \le 30$ (7)	[0045] In this case of the present invention, the ejection airflow effective area of the air blown by the impeller blade unit 3 becomes $2\pi r\varepsilon h$. Here it is definitively set forth that if the relationship defined by the following expressions (6) and (7) using a parameter β is satisfied, the airflow speed will not have the maximum value on the upper surface of the lower endwall portion 2, so that higher cooling efficiency with higher static pressure can be obtained. $2\pi r\varepsilon h = \beta r^2$ (6) $3 \le \beta \le 30$ (7)

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Paragraph [0047]	
[0047] The reason for 3 ≤ □ is that if □ has a value less than three, the airflow speed maximum may be at the upper surface of the lower endwall portion 2, and a windage loss similar to conventional centrifugal fans may be produced at the upper surface of the lower endwall portion 2, leading to decreased cooling efficiency of the fan. On the other hand, the reason why □ ≤ 30 is that if n has a value greater than 30, the impeller may become axially over-extensive in accordance with the larger value of □, making it difficult to obtain stable rotation of a cantilever-type impeller, even though the airflow speed does not have its maximum value on the upper surface of the lower endwall portion 2. In certain practical applications, the value of □ thus is preferably 30 or smaller.	[0047]The reason for 3 ≤ β is that if β has a value less than three, the airflow speed maximum may be at the upper surface of the lower endwall portion 2, and a windage loss similar to conventional centrifugal fans may be produced at the upper surface of the lower endwall portion 2, leading to decreased cooling efficiency of the fan. On the other hand, the reason why β ≤ 30 is that if β has a value greater than 30, the impeller may become axially over-extensive in accordance with the larger value of β, making it difficult to obtain stable rotation of a cantilever-type impeller, even though the airflow speed does not have its maximum value on the upper surface of the lower endwall portion 2. In certain practical applications, the value of β thus is preferably 30 or smaller.

Claim 36	
36. A cantilever-type impeller that connects with a motor component to form a centrifugal fan motor for cooling portable electronic devices and other small devices, an impeller upper end corresponding to the impeller side of the fan motor and an impeller lower end corresponding to the motor-component side of the fan motor being defined along the impeller rotational axis, the impeller comprising: a rotational force transmission portion provided on the impeller lower end, for receiving driving force from the motor component; a lower endwall portion fixed correspondingly to the rotational force transmission portion, the lower endwall portion therein configuring a wall surface; and an impeller blade unit having plural blades, each of the blades at its lower end being fixed outer-marginally to the upper surface of the lower endwall portion and each of the blades extending axially to its upper end, the blades together defining an opening at the impeller upper end, and rotation of said impeller blade unit therein generating an airflow streaming along the rotational axis through the opening and towards said lower endwall on its upper surface, said impeller blade unit being dimensioned such that given that 2r represents the diameter to the outer circumference of the impeller blade unit, h represents the axial height of the impeller blade unit, and □ represents a parameter, the relationships $2\pi rh = \square\pi r^2$, $4 \le \square \le 40$, and r ≤ 12.5 mm are satisfied.	36. A cantilever-type impeller that connects with a motor component to form a centrifugal fan motor for cooling portable electronic devices and other small devices, an impeller upper end corresponding to the impeller side of the fan motor and an impeller lower end corresponding to the motor-component side of the fan motor being defined along the impeller rotational axis, the impeller comprising: a rotational force transmission portion provided on the impeller lower end, for receiving driving force from the motor component; a lower endwall portion fixed correspondingly to the rotational force transmission portion, the lower endwall portion therein configuring a wall surface; and an impeller blade unit having plural blades, each of the blades at its lower end being fixed outer-marginally to the upper surface of the lower endwall portion and each of the blades extending axially to its upper end, the blades together defining an opening at the impeller upper end, and rotation of said impeller blade unit therein generating an airflow streaming along the rotational axis through the opening and towards said lower endwall on its upper surface, said impeller blade unit being dimensioned such that given that $2r$ represents the diameter to the outer circumference of the impeller blade unit, h represents the axial height of the impeller blade unit, and α represents a parameter, the relationships $2\pi rh = \alpha\pi r^2$, $4 \le \alpha \le 40$, and $r \le 12.5$ mm are satisfied.

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Claim 40	
40. A centrifugal fan motor for cooling portable electronic devices and other small devices, the fan motor including an impeller, and a motor component having a rotary section, a stationary section and a bearing, the bearing supporting the rotary section rotatably against the stationary section for rotation about the motor rotational axis, an impeller upper end corresponding to the impeller side of the fan motor and an impeller lower end corresponding to the motor-component side of the fan motor being defined along the motor rotational axis, said impeller connected with the rotary section and comprising: a rotational force transmission portion provided on the impeller lower end, for receiving driving force from the motor component; a lower endwall portion fixed correspondingly to said rotational force transmission portion, for structuring a wall; and an impeller blade unit having plural blades, each of the blades at its lower end being fixed outer-marginally to the upper surface of the lower endwall portion and each of the blades extending axially to its upper end, the blades together defining an opening at the impeller upper end, and rotation of said impeller blade unit therein generating an airflow streaming along the rotational axis through the opening and towards said lower endwall on its upper surface, said impeller blade unit being dimensioned such that given that 2r represents the diameter to the outer circumference of the impeller blade unit, h represents the axial height of the impeller blade unit, and □ represents a parameter, the relationships $2\pi rh = \square\pi r^2$, $4 \leq \square \leq 40$, and $r \leq 12.5$ mm are satisfied.	40. A centrifugal fan motor for cooling portable electronic devices and other small devices, the fan motor including an impeller, and a motor component having a rotary section, a stationary section and a bearing, the bearing supporting the rotary section rotatably against the stationary section for rotation about the motor rotational axis, an impeller upper end corresponding to the impeller side of the fan motor and an impeller lower end corresponding to the motor-component side of the fan motor being defined along the motor rotational axis, said impeller connected with the rotary section and comprising: a rotational force transmission portion provided on the impeller lower end, for receiving driving force from the motor component; a lower endwall portion fixed correspondingly to said rotational force transmission portion, for structuring a wall; and an impeller blade unit having plural blades, each of the blades at its lower end being fixed outer-marginally to the upper surface of the lower endwall portion and each of the blades extending axially to its upper end, the blades together defining an opening at the impeller upper end, and rotation of said impeller blade unit therein generating an airflow streaming along the rotational axis through the opening and towards said lower endwall on its upper surface, said impeller blade unit being dimensioned such that given that 2r represents the diameter to the outer circumference of the impeller blade unit, h represents the axial height of the impeller blade unit, and α represents a parameter, the relationships $2\pi rh = \alpha\pi r^2$, $4 \leq \alpha \leq 40$, and $r \leq 12.5$ mm are satisfied.

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Claim 61	
61. A cantilever-type impeller that connects with a motor component to form a centrifugal fan motor for cooling portable electronic devices and other small devices, an impeller upper end corresponding to the impeller side of the fan motor and an impeller lower end corresponding to the motor-component side of the fan motor being defined along the impeller rotational axis, the impeller comprising: a rotational force transmission portion provided on the impeller lower end, for receiving driving force from the motor component; a lower endwall portion fixed correspondingly to the rotational force transmission portion, the lower endwall portion therein configuring a wall surface; and an impeller blade unit having plural blades, each of the blades at its lower end being fixed outer-marginally to the upper surface of the lower endwall portion and each of the blades extending axially to its upper end, the blades together defining an opening at the impeller upper end, and rotation of said impeller blade unit therein generating an airflow streaming along the rotational axis through the opening and towards said lower endwall on its upper surface, said impeller blade unit being dimensioned such that given that 2r represents the diameter to the outer circumference of the impeller blade unit, h represents the axial height of the impeller blade unit, and □ represents a parameter, the relationships $2\pi rh = \square\pi r^2$, $5 \leq \square \leq 35$, and $r \leq 12.5$ mm are satisfied.	61. A cantilever-type impeller that connects with a motor component to form a centrifugal fan motor for cooling portable electronic devices and other small devices, an impeller upper end corresponding to the impeller side of the fan motor and an impeller lower end corresponding to the motor-component side of the fan motor being defined along the impeller rotational axis, the impeller comprising: a rotational force transmission portion provided on the impeller lower end, for receiving driving force from the motor component; a lower endwall portion fixed correspondingly to the rotational force transmission portion, the lower endwall portion therein configuring a wall surface; and an impeller blade unit having plural blades, each of the blades at its lower end being fixed outer-marginally to the upper surface of the lower endwall portion and each of the blades extending axially to its upper end, the blades together defining an opening at the impeller upper end, and rotation of said impeller blade unit therein generating an airflow streaming along the rotational axis through the opening and towards said lower endwall on its upper surface, said impeller blade unit being dimensioned such that given that $2r$ represents the diameter to the outer circumference of the impeller blade unit, h represents the axial height of the impeller blade unit, and α represents a parameter, the relationships $2\pi rh = \alpha\pi r^2$, $5 \leq \alpha \leq 35$, and $r \leq 12.5$ mm are satisfied.

Claim 64	
64. A cantilever-type impeller that connects with a motor component to form a centrifugal fan motor for cooling portable electronic devices and other small devices, an impeller upper end corresponding to the impeller side of the fan motor and an impeller lower end corresponding to the motor-component side of the fan motor being defined along the impeller rotational axis, the impeller comprising: a rotational force transmission portion provided on the impeller lower end, for receiving driving force from the motor component; a lower endwall portion fixed correspondingly to the rotational force transmission portion, the lower endwall portion therein configuring a wall surface; and an impeller blade unit having plural blades, each of the blades at its lower end being fixed outer-marginally to the upper surface of the lower endwall portion and each of the blades extending axially to its upper end, the blades together defining an opening at the impeller upper end, and rotation of said impeller blade unit therein generating an airflow streaming along the rotational axis through the opening and towards said lower endwall on its upper surface, said impeller blade unit being dimensioned such that given that 2r represents the diameter to the outer circumference of the impeller blade unit, h represents the axial height of the impeller blade unit, Z represents the number of blades in the impeller blade unit, d represents the thickness of the blade unit, and □ represents a parameter, the relationships $2\pi r\varepsilon h$ = □πr^2, 3 ≤ □ ≤ 30, 2r ≤ h, and r ≤ 12.5 mm, wherein $\varepsilon = (2\pi r - Zd)/2\pi r$, are satisfied.	64. A cantilever-type impeller that connects with a motor component to form a centrifugal fan motor for cooling portable electronic devices and other small devices, an impeller upper end corresponding to the impeller side of the fan motor and an impeller lower end corresponding to the motor-component side of the fan motor being defined along the impeller rotational axis, the impeller comprising: a rotational force transmission portion provided on the impeller lower end, for receiving driving force from the motor component; a lower endwall portion fixed correspondingly to the rotational force transmission portion, the lower endwall portion therein configuring a wall surface; and an impeller blade unit having plural blades, each of the blades at its lower end being fixed outer-marginally to the upper surface of the lower endwall portion and each of the blades extending axially to its upper end, the blades together defining an opening at the impeller upper end, and rotation of said impeller blade unit therein generating an airflow streaming along the rotational axis through the opening and towards said lower endwall on its upper surface, said impeller blade unit being dimensioned such that given that $2r$ represents the diameter to the outer circumference of the impeller blade unit, h represents the axial height of the impeller blade unit, Z represents the number of blades in the impeller blade unit, d represents the thickness of the blade unit, and β represents a parameter, the relationships $2\pi r\varepsilon h = \beta\pi r^2$, $3 \leq \beta \leq 30$, $2r \leq h$, and $r \leq 12.5$ mm, wherein $\varepsilon = (2\pi r - Zd)/2\pi r$, are satisfied.

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Claim 67	
67. A centrifugal fan motor for cooling portable electronic devices and other small devices, the fan motor including an impeller, and a motor component having a rotary section, a stationary section and a bearing, the bearing supporting the rotary section rotatably against the stationary section for rotation about the motor rotational axis, an impeller upper end corresponding to the impeller side of the fan motor and an impeller lower end corresponding to the motor-component side of the fan motor being defined along the motor rotational axis, said impeller connected with the rotary section and comprising: a rotational force transmission portion provided on the impeller lower end, for receiving driving force from the motor component; a lower endwall portion fixed correspondingly to said rotational force transmission portion, for structuring a wall; and an impeller blade unit having plural blades, each of the blades at its lower end being fixed outer-marginally to the upper surface of the lower endwall portion and each of the blades extending axially to its upper end, the blades together defining an opening at the impeller upper end, and rotation of said impeller blade unit therein generating an airflow streaming along the rotational axis through the opening and towards said lower endwall on its upper surface, said impeller blade unit being dimensioned such that given that 2r represents the diameter to the outer circumference of the impeller blade unit, h represents the axial height of the impeller blade unit, Z represents the number of blades in the impeller blade unit, d represents the thickness of the blade unit, and □ represents a parameter, the relationships $2\pi r\varepsilon h = □\pi r^2$, $3 \leq □ \leq 30$, $2r \leq h$, and $r \leq 12.5$ mm, wherein $\varepsilon = (2\pi r - Zd)/2\pi r$, are satisfied.	67. A centrifugal fan motor for cooling portable electronic devices and other small devices, the fan motor including an impeller, and a motor component having a rotary section, a stationary section and a bearing, the bearing supporting the rotary section rotatably against the stationary section for rotation about the motor rotational axis, an impeller upper end corresponding to the impeller side of the fan motor and an impeller lower end corresponding to the motor-component side of the fan motor being defined along the motor rotational axis, said impeller connected with the rotary section and comprising: a rotational force transmission portion provided on the impeller lower end, for receiving driving force from the motor component; a lower endwall portion fixed correspondingly to said rotational force transmission portion, for structuring a wall; and an impeller blade unit having plural blades, each of the blades at its lower end being fixed outer-marginally to the upper surface of the lower endwall portion and each of the blades extending axially to its upper end, the blades together defining an opening at the impeller upper end, and rotation of said impeller blade unit therein generating an airflow streaming along the rotational axis through the opening and towards said lower endwall on its upper surface, said impeller blade unit being dimensioned such that given that $2r$ represents the diameter to the outer circumference of the impeller blade unit, h represents the axial height of the impeller blade unit, Z represents the number of blades in the impeller blade unit, d represents the thickness of the blade unit, and β represents a parameter, the relationships $2\pi r\varepsilon h = \beta\pi r^2$, $3 \leq \beta \leq 30$, $2r \leq h$, and $r \leq 12.5$ mm, wherein $\varepsilon = (2\pi r - Zd)/2\pi r$, are satisfied.